

The claimed invention is directed to a molding composition that contains polycarbonate resin, modified clay and carboxylic acid. The modifier of the clay is a quaternary ammonium salt or quaternary phosphonium salt (herein Q-Salt). The inventive composition features impact performance that is significantly better than a corresponding composition that includes no acid.

Claims 1-8, 11 and 12 stand rejected under 35 U.S.C. 103(b) said to be unpatentable over U.S. Patent 6,610,770 (herein Ross I) in view of U.S. Patent 5,804,613 (Beall) further in view of U.S. Patent 6,380,295 (Ross II)

Ross I disclosed a composition having flame retardant properties that contains (col.4, lines 4 et seq.)

“an organic chemical/clay mixture prepared by the reaction of a smectite clay and one or more quaternary ammonium compounds and/or optionally one or more organic materials” (emphasis added)

That the “organic materials” – and thus carboxylic acids generically - are alternative to Q-Salts and are but optional is additionally expressed in column 5, line 48, column 8, line 47, column 10, line 30 and column 10, line 40.

In short Ross I disclosed a material system in which Q-Salts and carboxylic acids are functionally equivalent. Further, Ross I evidences no recognition nor does it suggest that the combination of Q-Salt and carboxylic acid yields any advantage over the use of either.

Beall disclosed intercalated layered material, including nano-sized clay and disclosed carboxylic acid as intercalate material.

Ross II disclosed clay/organic chemical composition consisting of an organic chemical/clay intercalate that has been ion-exchanged and reacted with a Q-Salt. In the one aspect (column 4, lines 36 et seq.) the composition contains (i) clay, (ii) Q-Salt which reacts via ion exchange with the clay and (iii) a non-ionic organic material that intercalates with the clay. Carboxylic acids are among the species of non-ionic organic materials listed in Table II (column 12).

The rejection is respectfully traversed.

Furthermore, unlike Ross I that disclosed carboxylic acid as an optional component to be used with Q-Salts, the inventive composition requires the presence of both components. The working examples presented in the application clearly demonstrate the critical effect the combination of carboxylic acid and a Q-Salt has on the impact performance of the claimed composition.

The tables below are extracts of the data tabulated in pages 8 and 9 of the application.

| Example | 2 | 6 | 3 | 7 |
|---------------------------|---------|----------|---------|----------|
| Polycarbonate, wt% | 97.5 | 97.25 | 95. | 94.5 |
| Clay, wt% | 2.5 | 2.5 | 5 | 5 |
| Acid, wt% | -- | 0.25 | -- | 0.5 |
| Impact Performance | | | | |
| Notched Izod, ft-lb/in | 1 | 3 | 0.6 | 2 |
| Unnotched Izod, ft-lb | 57.1 | No break | 13.5 | No Break |
| Multi-axial impact, ft-lb | 27.6 | 46.1 | 2.3 | 40.7 |
| Fracture mode | shatter | Ductile | Brittle | Ductile |

The results show that compositions containing polycarbonate and quaternary ammonium salt-modified clay (Examples 2 and 3) exhibit inferior impact performance in comparison to corresponding compositions that additionally contain the claimed acid (Examples 6 and 7).

| Example | 4 | 5 | 8 | 9 |
|---------------------------|---------|---------|----------|----------|
| Polycarbonate, wt% | 97.5 | 95 | 97.25 | 94.5 |
| Clay, wt% | 2.5 | 5 | 2.5 | 5 |
| Acid, wt% | -- | -- | 0.25 | 0.5 |
| Impact Performance | | | | |
| Notched Izod, ft-lb/in | 1.5 | 0.5 | 1.7 | 1.3 |
| Unnotched Izod, ft-lb | 64.1 | 13.4 | No Break | No Break |
| Multi-axial impact, ft-lb | 39.7 | 2 | 49 | 40.6 |
| Fracture mode | shatter | Brittle | Ductile | Ductile |

A comparison between Examples 4 and 5 that contain no acid and Examples 8 and 9 which do, point to similar advantages resulting upon the claimed composition where both Q-Salt and carboxylic acid are included.

These results are clearly surprising and unexpected in view of Ross I. Nothing in Beall and /or Ross II is seen to augment Ross I to suggest the presently claimed invention.

The above is believed responsive to the Office Action and overcoming the stated rejection. Reconsideration of the application, withdrawal of the rejection and an early indication of the allowability of the claims are solicited.

Respectfully submitted,

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